

CLAIMS

We claim:

1. A device for determining the coagulation state of a sample comprising:
a volume for receiving a sample to be analysed;
at least one particle disposed within said volume wherein said particle comprises at least one material which experiences a force when placed in a magnetic field;
a means for applying a magnetic field to at least part of the volume; and
at least one magnetic field sensor operative to detect movement and/or position of the at least one particle;
wherein the movement and/or position of said particle is correlated to the coagulation state of said sample.
2. The device of claim 1, wherein said device further comprises a display.
3. The device of claim 1, wherein said device displays a value that may be correlated with a disturbance of hemostasis.
4. The device of claim 1, wherein said device displays a clotting time and/or an INR value.
5. The device of claim 1, wherein said sample may be blood or plasma.
6. The device of claim 1, further comprising a filling chamber.
7. The device of claim 6, further comprising a filling device for filling the chamber
8. The device of claim 7, where said filling device comprises a capillary.
9. The device of claim 1, wherein said material which experiences a force when placed in a magnetic field may be ferromagnetic, paramagnetic, or superparamagnetic.
10. The device of claim 1, where said particle is generally spherical.
11. The device of claim 1, where said particle has a size in the range of about 2 to about 500µm,
12. The device of claim 11, wherein said particle has a size in the range of about 2 to about 20µm in at least one direction.
13. The device of claim 1, wherein said particle may comprise two or more different materials

and wherein at least one material experiences a force when exposed to a magnetic field.

14. The device of claim 1, wherein more than one particle is disposed in said volume.

15. The device of claim 1, wherein said magnetic fields is between about 1 and about 100 mT.

16. The device of claim 15, wherein said magnetic field is between about 10 and about 50 mT.

17. The device of claim 16, wherein said magnetic field is between about 10 to about 20 mT.

18. The device of claim 1, wherein said device further comprises at least one reagent disposed within a chamber prior to introduction of a sample into said device.

19. The device of claim 18, wherein said reagent is selected from the group consisting of: clotting agents, anti-clotting agents, and reagents suitable for measurement of a disturbance of hemostasis.

20. The device of claim 1, wherein said means for providing a magnetic field comprises two spaced apart electromagnets.

21. The device of claim 1, wherein said magnets are activated alternately with a direct current to produce a constant field.

22. The device of claim 1, wherein said magnetic field sensor is a Hall Effect sensor.

23. The device of claim 1, wherein said device further comprises circuitry for measuring the time elapsed from introduction of a sample until a change in coagulation state is detected.

24. The device of claim 1, wherein said device further comprises a control means.

25. A device for determining the coagulation time of a sample, the device comprising:

a container defining a chamber for holding a quantity of said sample, wherein the chamber holds at least one particle;

a magnetic device co-operating with said container; and

a magnetic field which causes the particle to migrate to and fro within the chamber through said sample.

26. The device of claim 25, wherein said chamber has a volume of less than about 25 μ l.

27. The device of claim 26, wherein said chamber has a volume less than about 5 μ l.

28. The device of claim 25, wherein said device further comprises a means for heating the chamber.

29. The device of claim 25, wherein said chamber is formed in a disposable support strip which is removable from the device.

30. A method of determining the coagulation state of a sample comprising:

providing a sample containing at least one particle comprising a material which experiences a force when placed in a magnetic field;

applying a magnetic field to said sample; and

using a magnetic field sensor to detect the movement and/or position of the at least one particle to determine the coagulation state of the sample.

31. A method of determining the coagulation time of a sample comprising:

causing particles comprised of material which experiences a force when placed in a magnetic field to move through said sample; and

noting as said coagulation time an instant at which changes in the properties of said sample reduce the movement.